

DOCUMENT RESUME

ED 244 554

HE 017 257

AUTHOR Seivert, Dick; Thomas, Frank B.
 TITLE Management Tools for the 80's.
 PUB DATE Dec 83
 NOTE 11p.; In: Information Resources and the Individual. Proceedings of the CAUSE National Conference (San Francisco, CA, December 11-14, 1983). Boulder, CO, CAUSE, 1984, p. 153-162. For the complete proceedings, see HE 017 245.
 PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)
 EDRS PRICE MF01/PC01 Plus Postage.
 DESCRIPTORS College Administration; *Computer Oriented Programs; *Documentation; Higher Education; Information Centers; *Management Information Systems; *Numerical Control
 IDENTIFIERS *Computer Centers

ABSTRACT

Two functions necessary for managing a computer center (organizing and controlling) are discussed with a focus on a nomenclature that was found to be useful for identifying parts of a system and was compatible with the definitions of most operational systems. For example, it is necessary to identify files, reports, and programs used in daily activities within the data center. A job reference number with eight positions is described that specifies all the parts of items within a system. Nine items that are standard for system design, and that will reduce interface problems, are also covered. It is suggested that programmers use the same standards in coding and developing programs. Documentation is addressed with attention to the various sections within the computer center, particularly the three main areas of support: the systems and programming sections, the operational section, and the user's department. An outline of documentation by each section is included. Attention is also directed to (1) the benefits of using job reference numbers for job accounting, including cost reporting to control resources, and (2) the control function for the production areas of data management, production, resource management, and security. Specifically, consideration is given to the objectives and benefits of a good job accounting system, disk and tape data management, hardware reliability, error recovery, and security packages. (SW)

 * Reproductions supplied by EDRS are the best that can be made *
 * from the original document. *

Management Tools for the 80's

Dick Seivert and Frank B. Thomas

University of Akron

Akron, Ohio

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☐ This document has been reproduced as
received from the person or organization
originating it.

☒ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

CAUSE

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

ABSTRACT

Using the two basic functions of management, namely organ-
ization and control, the authors first describe a naming
convention that is used to identify those parts of a system
common to the system and identifiable throughout the data
center. In support of controls for computer center resources,
the authors discuss applications and software packages available.
The objectives and benefits of a good job accounting system,
disk and tape data management, hardware reliability, error
recovery and security packages are presented.

MANAGEMENT TOOLS FOR THE 80'S

The basic functions that a manager must perform can be described as
1) organizing, 2) planning, 3) communicating and 4) controlling. This paper
will deal with two of these functions that are necessary for managing a
computer center, namely organizing and controlling.

The first topic deals with how we identify the parts or items that make
up our system. Any naming convention should tie all the items together
within a system. For example, we may want to identify files, reports,
programs, forms, etc. that we encounter in our day-to-day activities within
the center. The nomenclature that we found most useful not only tied the
"items" of a system together, but also satisfied the following definitions
which describe most operational systems.

1. A system is implemented in time-dependent jobs called job
runs. Time dependent simply means certain jobs must be
run and completed before other jobs can run. For
example, we normally want our files updated before we run
our reports.
2. A job consists of a series of steps to be performed.
3. A step is a task that is automated (computerized) or it
may be a manual task that has to be performed.
4. A computer program is an automated step or task.

Paper presented at the
CAUSE National Conference
(San Francisco, CA, Dec. 11-14, 1983)

ED244554

14E 017 257
CSE CIP 341

At this point we would like to emphasize that this definition will apply for either time-sharing or batch-type applications. The differences will be reflected in the job-run flowcharts.

Using the above definitions we would like to define a job reference number whose sole purpose is to identify all the parts of items within a system. Please note that this job reference number will also serve as the identifier of any internal chargeback reporting.

The format of the job reference number is eight positions: the first 3 positions identifies the system and the fourth position identifies the job, step, program, report, etc. The last four positions are sequentially assigned as required. The eight positions are as follows:

AANBYYYY where the first three positions identifies the system;

Example: PR1 - The first payroll system
PR2 - The revised payroll system

AANBYYYY the fourth position is a letter that identifies the item or part of the system

Identifier Codes: B

D - Disk file
F - Form number
J - Job number
M - Memo number
P - Program number
R - Report number
S - System or step
T - Tape file
U - Utility program
X - Subprogram
Q - Screen format

Examples:

PR1S0000 - Payroll system
PR1P0010 - Payroll program #10
PR1R0001 - First report number 1
in the payroll system

Design Standards

Continuing with the application of standards to system design it is important that the items listed below be completed in the design documentation before the programming begins. These items will reduce interface problems that cause most system failures. The following items are standard for system design:

1. Job run flowcharts
2. File layouts
3. Data logs
4. File logs that cross reference files with programs
5. Form log and report log
6. Report layouts with report numbers
7. Screen format with screen numbers
8. Program specifications for each program
9. Program logic flowcharts

The above items need the standard naming convention of the job reference number to identify reports, files, programs, screen formats, forms, and jobs by a unique number. The file and form logs are a cross index between files and forms to their corresponding program number.

Programming Standards

As we continue into the development of programs, it would be beneficial if each programmer coded using the same standards - basically with the same tools. Would you like to take your Chevrolet into the garage and have it fixed with a machine that was equipped to service a Mazda? In applying standards to programming we first will standardize the language and second discuss the program structures.

The verbs ALTER, VARYING, UNTIL, Nested IF's, compound verbs such as AND, OR, etc., will be prohibited. The KISS method will be applied to coding with one statement per card. Paragraph names will be sequenced with A10 before A20, etc. The program will be modular with perform statements in the main line and all paragraphs physically located at the bottom of the program. No paragraph may be accessed by falling through the paragraph to be performed. If you have coding standards, productivity will be high because you will not be spending all of your time trying to identify items not clearly defined. Your programmers will also have a common method to apply for program coding and will have the ability to read each other's programs.

What Kind of Documentation and How Much

In this section the documentation will be tied together within the various sections of the computer center. When a set of standards as described above are used, the systems documentation can be broken down to satisfy what is needed by the major sections within the computer center.

Systems documentation encompasses the three main areas of support, the Systems and Programming Section, Operational Section, and the User's Department. The Operational Section consists of three areas, Data Entry, Scheduling or Control and Computer Operations.

As illustrated on the following pages, each section's documentation is based on the needs of that section. Some of the documentation is duplicated to satisfy that need. For example a report log is required in the Systems and Programming documentation, in the Control Section of the computer center for distribution of reports, and finally in the user documentation to let the external user know what reports are available and when they will be run.

The following documentation is a suggested breakdown by section and can be adjusted to meet the needs of your organization.

System Documentation

A. Systems and Programming Documentation

1. System Documentation
 - a. System flowchart
 - b. Job run flowcharts
 - c. Input forms and formats
 - d. Output forms and formats
 - e. Output report layouts
 - f. Master file layouts and data logs
 - g. Screen formats
 - h. Report log
 - i. File log
 - j. Program log
2. Programming Documentation
 - a. Program flowcharts
 - b. Program specifications
 - c. Program listings
 - d. Sample inputs and outputs
 - e. Work file layouts

B. Operational Documentation

1. Library
 - a. Assigned space for disk
 - b. Rotational procedures for tape
2. Control
 - a. Run request/scheduling procedures
 - b. Deck setup or JCL listing by program by job
 - c. Report logs and distribution
 - d. Logging and balancing procedures
 - e. Job run flowcharts
3. Key punch
 - a. Sample form and card layouts
 - b. Key punching and verifying instructions
4. Operators
 - a. Job run flowcharts
 - b. Operating instructions for each step
 - c. Error and recovery procedures for each step
 - d. JCL listing by job

- C. User's Documentation
1. Job name and number
 2. Description of each job
 3. Run request procedures
 4. Schedule run log of each report
 5. Report log
 6. Description of each report with samples

Benefits of Standards in System Design

Not only does the job reference number identify the items within a system, it goes hand in hand with job accounting so that your job accounting reports by job run or program steps are now formalized and the user community has more confidence in the computer center's reporting. No longer will you see such programs or steps named "HARRY'S - WONDER" or "MARGE'S - BEST."

A second benefit derived from utilizing this standard is that manual procedures within your center can also be documented in the same manner. Each manual set of steps can be related to a unique job number. Similar forms utilized for standard practices can be assigned a system prefix. For example, our center utilizes several types of standard forms in the documentation of each system. We assign to forms such as Program Logs, Report Logs, Operation Trouble Report Logs a general form number that has a system prefix PPl (Practices and Procedures).

The benefits from standard naming conventions for all systems within a computer center is immeasurable. We now have a method of tracking every form, program, tape file, etc, that we use.

By associating the standard naming convention into our job accounting system, we have a better management tool for the control of disk and tape files as well as assistance for system project control. The development cost of each system is captured and this cost is then separated from production costs. We can also utilize these standards in the tape library and disk library systems as we relate the usage and space reporting back to the system that requires these files.

Job Accounting

Job accounting is a tool that can be used to relate project costs, user demand on resources, and hardware usage. Our approach to job accounting will be to describe the files to you and then discuss the reporting requirements. First let me define job accounting as a system or procedure that will capture all labor and machine costs within the computer center.

Three master files are required to capture the data, a work order master file, a time and activity file to collect both labor and machine time, and a table master file with "type of work" codes versus cost and price data. Cost table entries by type of work are required to recover the

cost of running your center. Price tables are also used to price your services above your cost for an outside user. The work order file captures the user identification such as department, account number and the percent to charge each account up to five accounts. The work order number is the internal charge number to use on time sheets and the computer job card. The work order is at least a five-digit number with the first digit being the year it is issued. The second digit references the cost center within the computer center. For example, a number 34005 is the 5th work order issued in 1983 to request Administrative development. The "4" references all work performed by the Administrative section, a "3" might represent academic systems and programming, and a "9" could be administrative production, etc.

The typical job accounting system will sort the time and activity file by work order number and compare the sorted work order master against the work order master to produce charges against the project. A subfield called type of work must be recorded on each time sheet entry and computer system master file to produce charges by the correct type of work rate for programming versus system. The system master file (SMF) will record the job card of a computer run and automatically place a type of work code for example '40' to signify a computer run.

The time and activity file will have both the machine SMF records and labor recorded. Machine utilization reports for tape I/O, disk I/O, cards read, lines printed, connect time, etc. can be produced for management over any given time period. The job accounting system is the manager's tool to provide him with hardware utilization, user charges and project costs by work order number.

Operations

Up to this point we have discussed development standards and cost reporting to control our resources. Now we will discuss the control function for the production areas. The functions for which the Manager of Operations is responsible, are: data management, production, resource management and security. The presence or lack of adequate controls in any of these areas can determine the efficiency, availability, accuracy, and the ability to recover computer center resources. Additionally some of the newer and most useful of the turnkey software tools to help with the management of computer resources are in the area of data management.

Data Management

The area of data management currently consists of attempting to control data stored on magnetic tape or data stored on some type of direct access storage device (DASD), usually disk. This requires an investment of time and/or funds in a tape management system and/or DASD management system. Although both of these systems deal with data storage management, the reason for installing each system differs. We will, therefore, consider the control requirements for each of these systems separately.

First we will discuss the tape management system. When we consider either developing or buying a tape management system, there are several major questions to be asked:

- Does the system have the capability to manage all of the tape handling aspects such as providing reports defined by the operational staff?
- Is the system flexible enough to handle future changes in your environment?
- Does the system provide as complete data protection as possible?
- Will the system prevent most critical mistakes by the operators? Is there full backup to the system and a full audit capability? Is there assurance that the system is up whenever needed and that the system data is correct?
- How easy is the system to install, maintain, and operate?

With the installation of any good computer system, we hope to turn these objectives into benefits. Depending upon the starting environment of the computer operation, different benefits may be realized in different situations, these major items are:

- Improved reliability in tracking tapes
- Better tape data set security
- Quicker availability of tapes
- Increased flexibility in types of retention
- Improved control over tape maintenance
- Better management of disaster recovery

It is important that your objectives be defined closely enough so that you get those benefits that will do you the most good, not those that a vendor has available to you.

Disk management, our second data management topic, is becoming vitally important as new hardware offers more tradeoffs in cost effectiveness, storage density, access time, etc. As the demand increases for more information processing and especially for more online data access, and as more budgetary constraints are placed on computer centers, the problems of insufficient free disk space, uncontrolled allocation of data sets, and lack of information about the current DASD environment can often be the determining factor in the acceptability of a new or expanded system.

The following benefits should be provided by a good DASD management system:

- Control of the allocation and removal of data sets
- Increased security, integrity, and availability of data sets

- Reduced job run problems
- Reduces abnormal end of job
- Better disk/channel performance
- Decreased time spent on fragmentation
- Reduced need for more DASD
- Increased knowledge of DASD status

There are other alternatives to data management for operations managers. Usually these alternatives will be in the form of adding more people to monitor the data sets, buying more tapes and more disk drives, writing additional report programs, or appointing a data manager and staff. All of these points are only partial solutions and must be measured against the cost of developing or purchasing data management systems.

A second major area of concern for which the operations manager is responsible is production control. Production control, for our purposes, will consist of the following items:

- Maintenance of operations documentation
- JCL management
- Software change control
- Input data control
- Job set-up and scheduling
- Job status tracking
- Job ABEND restarts control
- Output control
- Distribution of output

A data center's problems are usually caused by programming errors or hardware problems only 25% of the time. The other 75% stem from problems related to manual efforts within the production area. One way to decrease the number of problems is to concentrate on parts of the production effort that lend themselves to automation.

Looking first at a system to handle the scheduling task, what are some of the major functions we could expect to automate? A good scheduling system should provide the following:

- Organization and definition of incoming data
- Forecasting of the future workload
- Automated initiation and control of processing tasks
- Comprehensive reporting and performance analysis

What are some of the benefits we should expect to receive from a scheduling system?

- Decreased JCL errors, more staff knowledge, and less reliance on key personnel because of standardized workload definitions
- Recognition of bottlenecks and workload requirements prior to the actual need

- Better workload sequencing and balancing, better facilitates scheduling, and the elimination of reruns due to out-of-sequence processing
- A better planning process because of the availability of accurate performance histories

A second area of production control that is a prime candidate for automation is in the area of job reruns. Rerun management, because it is such an important part of production control, should provide for the monitoring, reporting, and control of reruns. The monitoring and reporting of reruns should allow the operations manager to determine the impact of reruns on the production schedule, the causes for the reruns, the amount of wasted resources, and identify recurring causes. The rerun control should be automatic so that operators are free from very difficult and error prone manual rerun procedures. Since the use of step restarts is desirable instead of full reruns, any system considered should handle step restarts automatically.

The benefits that we should expect from an automated rerun system are:

- Reduced costs for hardware, personnel, and supplies
- Fewer missed deadlines
- Increased user satisfaction

One additional software tool worthy of a short discussion is that of a hardware reliability measurement system. It can be called an antifailure system, but in itself it cannot prevent failures, only provide the information necessary to educate, identify, and apply pressure. A good system should provide:

- A review of the reliability of individual devices to identify weak links
- Feedback on the adequacy of the maintenance
- Comparative data between vendors by which to measure the relative reliability of equipment
- Data to aid in the selection of new equipment
- Increased vendor accountability

The computer operation that will be the most reliable is the one in which the management is fully aware of the reliability of the system and the individual devices. The single necessary ingredient needed to make a hardware reliability system work is a sound relationship between a knowledgeable user and a good vendor.

SECURITY

Although as managers we have responsibility for both physical security and access to our installation, today we will be discussing the ability to stop unauthorized persons from gaining access to your data files.

The basic objectives of computer security is to provide corrective measures to reduce all threats from every source thus resulting in a certain level of risk. Remember the threats can be both malicious and non-malicious. Your job is to stop all threats that are made to access your center and your data by unauthorized persons. Log on codes and passwords are easily broken with the use of dial-up ports and personal computers.

A good security package intercepts each log on by the user and verifies that the user is authorized to access computer and then to only certain data sets. Only those users with predefined attributes may have access and if they do obtain access they may still be restricted to a READ only of their file. The center must plan far in advance to install such a package. Most security packages will have several modes of operations.

- The dormant or quiet mode provides warning messages.
- The fail mode aborts unauthorized users who attempt to use defined files but allows access to undefined files.
- The abort mode will stop all users that are not defined.

Logging of all activity and violations must be available for all modes. Usually there is a migration from dormant to fail to abort modes as the package is installed for each system.

There are many packages today - IBM RAC-F, TOP SECRET, SECURE, ACF-2, GUARDIAN, SECURE, and COPS. Most of these are for CICS users in an IBM environment, but you may select another by doing some researching with your vendor.

In conclusion, we have discussed the organization and control of a data center. The awareness of the tools that are available is a start. Naturally the alternatives to these tools must be weighed carefully against the cost benefits.